Overview and QuickStart Guide to the BCD396XT

- **Introduction to controls and keys**
    - Controls
        - Scroll Control (SC)
            - Located on top of the scanner on right side
            - Can be rotated or pushed in
        - Function Mode Button [Func]
            - The top button on the left side of the scanner
            - Primarily used to activate the second function on any given key
        - Menu Mode Button [MENU]
            - The bottom button on the left side of the scanner
            - Used to activate the various menus available for scanner operation and programming
    - Keypad
        - The set of keys located on the front of the scanner is the keypad
        - The 16 keys are:
            - Numeric keys 0-9
            - Dot key
            - E key
            - Hold key...halts scanning operation
            - Scan key
                - Initiates scanning of channels
                - Basic Concept of scanning: Unlike standard AM or FM radio stations, most two way communications do not transmit continuously.Your BCD396XT scans programmed channels until it finds an active frequency, then stops on that frequency and remains on that channel as long as the transmission continues. When the transmission ends the scanning cycle resumes until the scanner receives another transmission
            - L/O = lockout key
            - Backlight/power [B/P] key
        - Each key has a second function printed in black next to the key
        - The second function is enabled by press/release (pressing and releasing) [Func] then pressing the desired key
- **Essential controls for basic operation**
    - Turning the scanner off/on...press/hold [B/P] key
    - Volume control...press/release SC then rotate SC control to desired volume setting displayed onscreen.
    - Squelch control
        - Squelch excludes undesired lower-power input signals that may be present at or near the frequency of the desired signal. Squelch is a noise gate that only allows signals at a specified strength over a specified threshold to be played through the speaker(wikiped)
        - To set the squelch level press/release [Func], press/release SC, then rotate SC to desired squelch level

        - A squelch of zero blocks no signals and static is audible
        - If squelch is set too high, all signals may be blocked
        - Normally set squelch at a level just above that needed to block static noise or other interference
- **Types of radio systems that can be scanned**
    - <u>Conventional systems</u>
        - Conventional scanning is a relatively simple concept. Each group of users in a conventional system is assigned a single frequency (for simplex systems) or two frequencies (for repeater systems). Any time one of them transmits, their transmission always goes out on the same frequency.
        - Until the late 1980s, this was the primary way that radio systems operated and conventional systems are still in use in many locations.
        - When you want to store a conventional system, all you need to know is the frequencies they operate on.
        - When you are scanning a conventional system, the scanner stops very briefly on each channel to see if there is activity. If there isn't, the scanner quickly moves to the next channel. If there is, then the scanner pauses on the transmission until it is over.
        - Simplex Operation
            - Simplex systems use a single frequency for both transmit and receive.
            - Most radios using this type of operation are limited to line-of-sight operation.
            - This type of radio is frequently used at construction job sites, and with inexpensive consumer radios such as GMRS/FRS radios.
            - The range is typically 1-8 miles, depending upon the terrain and many other factors
        - Repeater Operation
            - Repeater systems use two frequencies: one transmits from the radio to a central repeater; the other transmits from the repeater to other radios in the system.
            - With a repeater-based system, the repeater is located on top of a tall building or on a radio tower that provides great visibility to the area of operation.
            - When a user transmits (on an input frequency), the signal is picked up by the repeater and retransmitted (on an output frequency).
            - The user's radios always listen for activity on the output frequency and transmit on the input frequency.
            - Since the repeater is located very high, there is a very large line of sight.
            - Typical repeater systems provide coverage out to about a 25-mile radius from the repeater location.
    - <u>Trunked Systems</u>
        - While conventional scanning worked great while there were only a few groups wanting to use the frequencies, but with the advent of smaller, lower-cost radios more and more agencies and

businesses wanted to take advantage of the utility of 2-way radio.

- As a result, the bands that were used most became full, so new users were not able to take advantage of the technology as quickly as they wanted.
- Trunking solved this frequency shortage by allowing multiple groups to use the same set of frequencies in a very efficient way.
- While each type of trunking system operates a little differently, they all work on the same basic premise: even in a system with a lot of users, only a few users are ever transmitting at any one time.
- In essence, a trunked radio system is packet switching computer network. Users' radios send data packets to a computer, operating on a dedicated frequency — called a Control Channel — to request communication on a specific talk-group. The controller sends a digital signal to all radios monitoring that talkgroup, instructing the radios to automatically switch to the frequency indicated by the system to monitor the transmission. After the user is done speaking, the users' radios return to monitoring the control channel for additional transmissions.
- This arrangement allows multiple groups of users to share a small set of actual radio frequencies without hearing each others' conversations.
- Trunked systems primarily conserve limited radio frequencies and also provide other advanced features to users.
- "Trunked" radio systems differ from "conventional" radio systems in that a conventional radio system uses a dedicated channel (frequency) for each individual group of users, while "trunking" radio systems use a pool of channels which are available for a great many different groups of users.
- For example, if police communications are configured in such a way that twelve conventional channels are required to permit citywide dispatch based upon geographical patrol areas, during periods of slow dispatch activity much of that channel capacity is idle. In a trunked system, the police units in a given geographical area are not assigned a dedicated channel, but instead are members of a talk-group entitled to draw upon the common resources of a pool of channels.(Wikiped.)
- Trunking sites are talkgroups assigned agencies that have different control channels in separated geographic area tha utilize the same trunked system. (My Def.)
- Instead of being assigned a frequency, as with conventional systems, each group is assigned a talkgroup ID.
- A central computer controls the frequency each group operates on...and this frequency selection is made each time a user transmits. So, while on a conventional system queries, replies, and follow-ups are all on a single frequency, they could each be on completely different frequencies on a trunked system.
- This semi-random frequency assignment made monitoring such a system impossible prior to Uniden’s invention of the TrunkTracker scanner.

- Not only does your BCD396XT scan channels like a conventional scanner, it actually follows the users of a trunked radio system.
- Once you know a talk group's ID, you can monitor all their communications.
- There are numerous types of trunked systems which will be explained in depth later.
- Types of trunked systems include:
    - Motorola,
    - EDACS,
    - LTR
- Trunking sites are talkgroups assigned to agencies that have different control channels in separated geographic areas but utilize the same trunked system.

- **Memory hiearchy and programming**
    - Dynamic Allocated Channel memory
        - Trunking sites are talkgroups assigned to agencies that have different control channels in separated geographic area tha utilize the same trunked system.
        - The BCD396's memory is organized in an architecture called Dynamic Allocated Channel memory.
        - This type of memory is organized differently and more efficiently than the bank/channel architecture used by traditional scanners.
        - Dynamic Allocated design matches how radio systems actually work much more closely, making it easier to program and use your scanner and determine how much memory you have used and how much you have left.
        - Instead of being organized into separate banks and channels, your scanner's memory is contained in a pool. You simply use as much memory as you need in the pool to store as many frequencies, talk group ID's, and alpha tags as you need , no memory space is wasted, and you can tell at a glance how much memory you have used and how much remains.
        - With a traditional scanner, when you program it to track a trunked system, you must first program the frequencies. Since you can only program one trunking system per bank in a traditional scanner, if there were (for example) 30 frequencies, the remaining channels in the bank are not used and therefore wasted.
        - Also, since some trunked systems might have hundreds of talk groups, you would have had to enter those types of systems into multiple banks in order to monitor and track all the ID's.
    - Memory organization
        - The basic unit of memory is the channel
        - Channel
            - Conventional system, a channel is a frequency
            - Trunked system, a channel is the talkgroup ID (TGID) within a trunked system.
            - A related collection of channels can be organized for easier selection/deselection.

- Organizational Hierarchy
    - System
        - Channel Group(s) usually referred to as just a group
            - Channels
- Example (Conventional system)
    - System: Bearcat County Public Safety
        - Group1 Law Enforcement Agencies
            - Channel 1 Bearcat County Sheriff 154.780 MHz
            - Channel 2 Smallville Police Department 155.370 MHz
        - Group 2 Fire Departments
            - Channel 3 Bearcat Fire and Rescue 155.475 MHz
            - Channel 4 Smallville Fire Department 154.890 MHz
            - Channel 5 Possum Township Volunteer Fire 155.130 MHz
        - Group3 Ambulance Services
            - Metro Ambulance service 154.600 MHz
            - Lifesaver MediVac 154.31 MHz
- Programming a new system into the BCD396XT
    - We will first create a **system** "space" using the above example:

- Press/release [MENU] "Program System" will be highlighted
- Press/release (SC) to select the highlighted option
- Rotate (SC) to scroll down the list of existing systems (if any) until "New System" is highlighted
- Press/release (SC) to select the highlighted option
- Rotate (SC) to scroll down the list "System Types" until "Conventional" is highlighted
- Press/release (SC) to select the highlighted option
- Press the "E" key for YES. (The "dot" key is for NO)
- "Edit Name" should now be highlighted
- Press/release (SC) to select the highlighted option
- We will now edit the name that was automatically assigned to the new name "Bearcat Co. PS.
    - The 1st letter should be highlighted and can be changed by rotating the (SC). Rotate until a "B" appears in the highlighted character cursor.
    - The <4 and the 6> key will shift the highlighted character to the left or right respectively. Press 4 to move to the next character to the left.
    - The character sequence as (SC) is rotated clockwise is A through Z, a through z, 1 through 9, 0, !, @, #, $, %, &, *, (,), -, /, <, >, ., ?, blank.
    - As before, rotate (SC) until an "e" appears then press "4"

        - Continue this process until the entire character string Bearcat Co. PS has been entered.
        - Note: the “dot” key will enter a blank space.
        - Press/release (SC) to enter the new name of the system.
    - A system is just a memory “location” until a group containing one or more channels is entered into the system space.
- Creating a **Channel Group** within the system space
  - Once a system has been created we can begin to add channel groups within the system
  - Using the Bearcat Co. PS system, we will now add the Law Enforcement Agencies Group (Group 1) which will be abbreviated to Law EnAgencies, since there is a 16 character limit

- Press [MENU]
- With “Program System” highlighted, press/release (SC) to select or open that submenu
- With (SC) scroll to the “Bearcat Co. PS” system and select it
- Scroll to “Edit Group” and select
    - With “New Group” highlighted select
    - With “Edit Name” highlighted select
    - “Group 1” appears with “G” selected...rotate (SC) until “L” appears and continue editing/entering characters until the entire string, Law EnAgencies is created
    - Press/release (SC) or [MENU] to complete entry
    - Repeat these steps to create a group for Fire Departments and a group for Ambulance services
    - Once groups have been created within a system, individual channels can be entered into a given group.
- Creating **channels** within existing groups
  - For a conventional system, a channel is simply a frequency
  - We will create a channel for Bearcat County Sheriff 154.780 MHz
    - 1.Select “Program system”
    - 2. Select desired system, “Bearcat Co. PS”
    - 3. Select “Edit Group”
- Select the group “Law EnAgencies”
- Scroll to “Edit Channel” and select
- Select “New Channel”
- Use keyboard to write the frequency 154.780
- Press/release (SC)... this enters the channel’s frequency and also assigns that frequency as the channel’s “Name”
- “Edit Name” should now be highlighted then selected
- You can now overwrite the assigned channel name withe the alpha entry system as before. in this case “Bearcat County Sheriff” or rather, whatever you choose as its abbreviation.
    - When finished, press/release (SC) and the frequency and name are now entered as a channel within the “Law EnAgencies” group within the “Bearcat Co. PS” system.

    - Follow the same procedure for entering the other frequencies within their appropriate system and group.
- Creating channels tor trunked systems is much more involved and is covered in detail in the Reference Guide.
- The term site is used in entering trunked system information; Site: a term reserved for trunked systems and is the memory location for storing the system frequencies including control channels on Motorola systems and LCN frequencies on EDACS & LTR.

This doc. addresses a lot of the questions that I had when I first took the BCD396XTout of the box. A great deal of the content was copied from Uniden's BCD396T reference manual. Some material is from Wikipedia. This is a work in progress by a rank beginner to scanning and very likely contains errors. I'm hoping that this is just a starting point upon which additions/corrections/suggestions can be added by more knowledgeable individuals. My goal is that this is just an introduction and consequently, I would like to keep it short.